Information Technology in the Ontario Government 1983-1985

Ontario
Management Board of Cabinet

Table of Contents

I INTRODUCTION 3

II MANAGEMENT SUMMARY 4

III DATA COLLECTION AND LIMITATIONS OF DATA 7

IV EXPENDITURE TRENDS DETAIL 8

- Overall Information Technology Spending Trends
- Components of Information Technology Expenditures
- Changing Functional Mix of Information Technology Spending
- Actual versus Estimated Expenditures
- Use of External Services

V TECHNOLOGY PENETRATION TRENDS 11

VI TRENDS IN SYSTEMS PERSONNEL 13

VII INFORMATION TECHNOLOGY SECURITY 14

VIII TABLES 17

1 Introduction

For several years, Management Board has published a brief annual report on Electronic Data Processing (EDP) spending throughout the Ontario government, based on information reported by all Ministries. This year, the scope of the report on spending was expanded to include other elements of information technology, such as office automation and end-user computing. Also, new is an interpretation of the spending trends, in addition to the tables and graphs that have been the core of previous reports.

The objective of this year's report is to provide an interpretation of overall trends in Information Technology usage occurring throughout the government. The reader is cautioned, however, from drawing conclusions at a government-wide level, without due regard for the decentralized characteristics of information technology utilization within the government. Although overall information technology spending is now in excess of $180 million per year, more than half the Ministries have budgets under $5 million. The trends identified in this report are simply aggregates of spending patterns of 23 separate Ministries, with widely differing budgets, in various stages of information technology development.

The focus of this report is on information technology patterns, and not on specific systems or projects. Data has been examined from a number of different perspectives and compared to past periods. Comparisons have been made to other provincial governments and the federal government. A survey of EDP spending in private sector organizations, published by a large research organization has been used to compare private and public sector spending patterns.

The themes found throughout this report are being experienced by all organizations utilizing information technology today:

- Spending on information technology is growing more rapidly than overall spending.
- The strong demand for computing processing capacity, growing faster than the rate at which price-performance is improving.
- The effect of current systems development on future operational and maintenance costs.
- The competition for discretionary funding between traditional systems development, and end user computing and office automation.
- The difficulties of keeping information technology costs on budget, as priorities and circumstances change.
- The ever-increasing penetration that information technology is making in the organization.

Other topics currently of particular interest within the government have also been reviewed. They include the use of external services, such as information technology consultants and service bureaux, a review of the results of the 1983 Systems Staffing Adjustment and the current status of Information Technology security.

In the computer processing and data communications areas, the economies of scale of the overall budget are achieved, as over 85% of the large scale computer processing is provided by the Computer & Telecommunication Services division of the Ministry of Government Services. The responsibility for providing other information technology services such as systems development, office automation and end-user computing, and the overall direction for information technology strategy, lies with the ministries themselves.

II Management Summary

The information presented here is based upon data reported by each ministry, covering the period 1983-84 through 1985-86. Prior years data and data from other sources has also been used throughout for comparative purposes.

EXPENDITURE TRENDS

The following are the key trends in Information Technology expenditures:

Information Technology costs are growing 8% faster than total.

Information technology spending has been growing at roughly 8% faster than the growth in overall government spending. In comparison to private sector organizations, this is slightly higher than the norm of 5%, but is similar or less than several white-collar industries, where the pressure to gain a competitive edge and increase productivity is fostering information technology expense growth of up to 15% greater than revenue growth.

Although expenses are still growing, the rate of growth is slowing.

After a large increase in overall information technology spending in 1982-83, due in part to the Vehicle Registration System in the Ministry of Transportation & Communications, the rate of growth has been slowing. In 1985-86, an increase of 7% after inflation is planned. This decline parallels the experience of several hundred EDP organizations surveyed by a large research company.

Information Technology expenses are 3.8% of total costs.

Information Technology expenses average 3.8% of the government's cost of doing business (transfer payments and public debt interest excluded). This proportion varies considerably by Ministry, ranging from a high of 15% to a low of 0.4%. In the private sector, technology costs vary between 1% and 12% of total revenue, depending on the industry.

Ontario Government spends less per capita on Information Technology than most other provinces.

Comparisons to other provinces are partially distorted by differences as to which agencies are included in the reporting.

Currently, Ontario ranks second to Quebec in overall spending on Information Technology ($183 million vs $222 million). Quebec however, includes several agencies such as school boards and workers' compensation board, not included in Ontario's total.

On a per capita basis, Ontario government spends $20 per year on information technology, compared to Quebec which spends $34. This is as expected, reflecting the economies of scale that a large province enjoys. Nationally, the average for provincial governments is $26. By comparison, the Federal government spends $40 per capita per year.

Hardware has become the largest single component of Information Technology costs.

In 1984-85, purchases of equipment ($59 million) surpassed staffing costs as the largest single category of information technology expenditures. Purchases of personal computers and local area networks exceeded $10 million, indicating that a substantial emphasis on office automation and end-user computing is developing.

Equipment purchases indicate a trend to decentralized processing.

In 1985-86, ministries are planning a significant increase in purchase of large minicomputers. This may be an indication of a trend seen in several other sectors to move away from central mainframe processing and locate the processing equipment closer to the end-user of the service.

There are several factors underlying this trend. They include the improved price-performance of super-minicomputers, the need for sub-second response time for improved programmer productivity, and the increase in costs for data communications.

Communication cost increases are the result of several factors: usage has been increasing as more systems become online or remote data capture; two ministries have moved their base of operations away from Toronto; and transmission costs have been subject to increasing prices.

The thrust is changing from traditional systems development to office automation and end-user computing.

The proportion of information technology costs spent on systems development has been dropping steadily since 1982-83. On an inflation adjusted basis, spending on systems development has dropped by 10% in this period. In the same period, expenditures on office automation and end-user computing have risen to over 13% of the total information technology budget ($22.1 million in 1984-85). It appears to reflect a change in users, priorities to direct discretionary funding to technologies more suited to the wide variety of business functions performed by the government.

Private Sector expenditures remain a constant proportion.

Overall, spending in the private sector remains roughly the same each year as a proportion of overall costs. Usage of external services, such as service bureaux and systems consultants dropped in 1984-85, whilst purchases of equipment rose.

In 1984-85, $7 million of computer processing services (13% of total) was purchased from external service bureaux. This was down from $8 million the previous year. An additional $2.3 million of printing and data entry services, were purchased externally.

The largest single category of external services is systems consultants. In 1984-85, over $11 million (37% of total staffing cost) was spent on consulting for systems development and maintenance. This was down from $13 million in the previous year.

Equipment purchases by ministries rose to $35.9 million in 1984-85, up $8.5 million from the 1983-84 level of $27.4 million. Purchases by the Computer & Telecommunication Services division of the Ministry of Government Services rose from $25.3 to $27.2 million in the same period.

TECHNOLOGY PENETRATION TRENDS

Three indicators were developed to measure the extent of technology penetration in each ministry. They are: "information technology spending per employee", "information technology spending as a percentage of total ministry expenditures", and "the number of employees per computer workstation". The following are the findings.

Information Technology spending per employee has doubled in ten years.

Information technology spending per employee, after adjusting for inflation, has doubled in the last 10 years. In 1984-85, an average of $2,040 per employee was spent for information technology services.

The Ontario government spends less on Information Technology than other sectors.

When compared to private sector white-collar organizations such as banks and insurance companies, spending per employee within the government is low. Two chartered banks surveyed are currently spending approximately $7,000 per employee, whilst one insurance company is spending over $10,000. Within the government, the average is $2,040, with only 4 ministries greater than $4,000. However, comparisons are distorted by the large number of employee blocks within the government who are unaffected by automation initiatives. As a more direct comparison, the Quebec government spent $2,945 per employee in 1984-85, while the Federal government spent $1,687 per employee.

Number of workstations is relatively low, but increasing.

The number of workstations increased 32% in 1984-85, but remains small in absolute terms. Ministries reported that there are now over 7,000 workstations in use across the government. This is an average of one per 11 employees. This is relatively low in comparison to banks and insurance companies, where the ratio is one workstation for every three employees.

Some ministries have employed Information Technology significantly more than others.

There is a wide variation in indicators of technology penetration between ministries. A medium-sized ministry leads in information technology spending indicators, whilst two ministries with smaller information technology budgets, have the highest proportion of workstations to employees.

SYSTEMS PERSONNEL TRENDS

In 1983, following a consultant study commissioned by the Ontario Systems Council, and a Civil Service Commission task-force, a Systems Staffing Adjustment was implemented by Management Board across all ministries. The objectives were to reduce the consultant employee ratio, thereby helping morale and reducing the high position vacancy rate that existed at that time, as well as reducing the dependency on consultants to provide systems development services.

The Adjustment allowed ministries to increase the number of permanent staff, by reducing the number of consultants used. In 1981, there were only 1.3 systems employees for each consultant. The target was to increase this to a 3 to 1 ratio. An additional objective was to utilize consultants more for systems maintenance, leaving more of the challenging systems development work for ministry employees. The results from this process as reported are as follows.

Use of consultants has dropped sharply.

The number of consultant "person-years" used in 1984-85 was 221, down from a high of 382 in 1982-83.

The ratio of employees to consultants has risen to 3.5 to 1.

The premium paid for using consultants is now 7.4% of staffing costs.

In 1984-85, a consulting person-year cost 24% more than one for a government employee. But at the current ratio of employees to consultants, the overall "premium" paid for using consultants instead of ministry staff, to do systems development and maintenance, is 7.4% of staffing costs.

The position vacancy rate has dropped — but not enough.

The vacancy rate for permanent information technology positions has dropped from 21% to 12%. Whilst this is a marked improvement, the level is still high by industry norms.

INFORMATION TECHNOLOGY SECURITY

In January 1984, Management Board issued an Interim Guideline on Information Technology Security to provide ministries with an approach for reviewing and upgrading information security to provide adequate protection for the confidentiality, integrity, and availability of information.

As part of the 1985 Information Technology Report, Management Board requested ministries to provide a brief update on the progress made to date towards compliance with the Interim Guideline.

Whilst the usefulness of the survey was somewhat diminished by limitations in some of the data received, the following conclusions are possible:

- In times of financial and staffing constraint, it is difficult for ministries to redirect scarce resources from areas of immediate pay off such as, maintenance and new development work, to contingency planning and related information technology security matters. Progress towards implementing the Interim Security Guideline has, therefore, been much slower than the ideal. However, progress *is* being made with more than half the systems meeting at least the basic level of protection and the remainder under review.
- Ministries have focussed on the critical systems, with almost 80% of them being at least at the basic level of security. However, only about 20% of these are adequately protected. This will have to be greatly improved in the 1985-87 time frame.
- Some ministries demonstrated a misconception that security, especially contingency processing, was a responsibility of the Ministry of Government Services Computing Centre. In fact, as the Guideline clearly states, each ministry has the responsibility for ensuring that contingency processing plans are in place for each of its systems and data files.

III Data Collection and Limitations of Data

The central data used in this report was collected from each Ministry after the completion of the fiscal year 1984-85. The reporting format differed from previous years, and required data for 1983-84 and 1984-85 "actuals" and 1985-86 "estimates". Additional data was collected for office automation, and end-user computing.

Comparative data has been used throughout the report. It includes data collected from ministries in previous years; published information on overall government expenditures by ministry (voted estimates); published reports of information technology in the federal and other provincial governments; research conducted on technology penetration in banks and insurance companies; and surveys published on information technology trends in the private sector.

Some ministries were not able to supply the information at the required level of detail, and were required to allocate expenses by estimation. Other ministries had some difficulties supplying non-cost information such as person-years and numbers of terminals. Several ministries had difficulties identifying all the personal computers in their organizations. As a result, whilst the trends identified in this report are believed to be accurate at the government-wide level, certain data elements at the ministry level may not be entirely reliable.

During the data collection period, certain constraint measures were imposed throughout the government. The information technology spending estimates for the year 1985-86, collected as part of this process, do not reflect these constraint measures.

All operational Ministries are included in this report. Policy Secretariats, "arms-length" agencies, and Crown corporations are excluded.

In order to reduce the data collected to basic information technology functions (systems development, maintenance, operations, and user computing), across-the-board formulae were applied to the raw data supplied by each ministry. These are consistent with past years, and were validated to be correct at the aggregate government total level, although there may be minor discrepancies in each ministry.

For the first time, ministries were grouped into size categories for the purpose of comparison. The categories used throughout this report are based upon actual information technology expenditures in 1984-85. They are $0-3 million, $3-8 million, $8-15 million, and over $15 million.

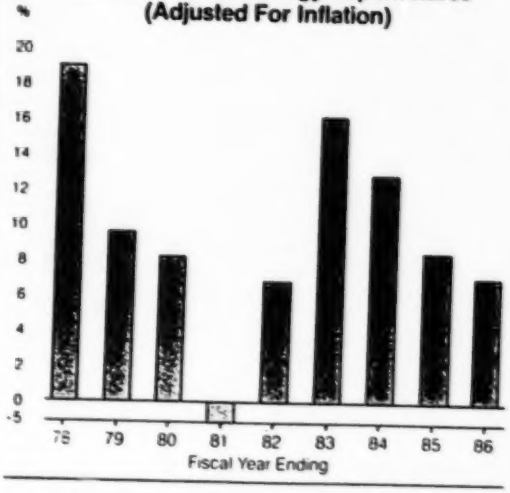
IV Expenditure Trends

OVERALL INFORMATION TECHNOLOGY SPENDING TRENDS

Growth of Information Technology Spending (see Tables 5 & 6, Section VIII)

The total government-wide expenditures for information technology in 1984-85 were $165.3 million, up from $146.1 million in the previous year. After adjusting for inflation, for the three year period from 1976/77 to 1979/80, Ontario's planned expenditures on information technology increased at an average rate of 12.1%. From 1980/81 to 1982/83, this dropped to 7.3%, but increased to 9.5% for the years 1982/83 to 1985/86. As indicated in Figure 1, there is a cyclical nature to total information technology spending, seemingly caused by the development and implementation of two or three very large systems projects.

Figure 1
Rates of Growth in Information Technology Expenditures (Adjusted For Inflation)



This actual growth is reflected in the percentage of the information technology expenditures to the total cost of doing the government's business. This increased from 2.5% in 1981 to 3.8% in 1985. From surveys, it is noted that total information technology costs in the private sector are usually in the range of 2 to 2.5% of revenue. However, the different basis of calculation (cost vs revenue) makes a direct comparison with government invalid.

In the period 1980-81 to 1984-85, overall ministry spending has increased at an average rate of 8% per year, just matching the average rate of inflation. Over the same period, planned information technology costs increased an average of 16%, creating an average differential of 8% per year between increases in information technology spending, and the overall spending increases in the organization.

A survey of private sector organizations during the same period found an average differential of 5%. However, this period included a severe recession where many organizations struggled to trim indirect costs, especially information technology. Another survey indicates that some white-collar organizations are now investing heavily in information technology to increase productivity or gain a competitive edge, and information technology costs are rising at a rate 15% greater than overall costs.

Comparison to other jurisdictions (see Table 8, Section VIII)

In comparison with other provinces, Ontario ranks second to Quebec in overall information technology spending. However, Quebec includes in its total, expenditures for agencies not included in the Ontario report. In terms of per capita spending, Ontario spends less than the overall provincial average. In the period 1980-81 to 1985-86, information technology costs in Ontario have been growing at a faster rate than all other provinces.

COMPONENTS OF INFORMATION TECHNOLOGY EXPENDITURES

Table 1 breaks out the information technology costs for 1983-84 and 1984-85 in a form that is readily compared to information published by the Quebec and the federal governments.

In 1984-85, equipment costs surpassed salaries as the largest single component of overall information technology expenditures. Equipment expenditures rose from $47.7 million in 1983-84 to $59.3 million in 1984/85.

Much of this increase in 1984-85 arose from the purchase of microcomputers, worth $9.6 million. In previous years, only those microcomputers purchased through the central systems organization in each ministry had been included. Whilst spending on microcomputers is

TABLE 1: COMPONENTS OF INFORMATION TECHNOLOGY COSTS

	1983-84		1984-85		Que.	Fed.
	$M	%	$M	%	%	%
Equipment	48	34	59	37	25	24
Salaries	52	36	58	36	51	47
Data Communications	11	8	15	10	4	5
Consultants	13	10	12	7	14	10
Service Bureaux	11	8	10	6	3	9
Software	4	3	5	3	—	3
Supplies	1	1	2	1	4	2
	140*	**100**	**161***	**100**	**100**	**100**

* differs from overall total because of accounting differences in the Computer and Telecommunications Services division of the Ministry of Government Services.

projected to decline by $3 million in 1985/86, a large increase in the purchase of minicomputers will more than offset this projected decline.

The large increase in equipment and communication expenditures over the last three years is an indicator of several trends: the rapid growth in end-user computing and office automation facilities; attempts to limit rising mainframe costs by replacement with minicomputers; and the implementation of several large systems across the province which require extensive communications.

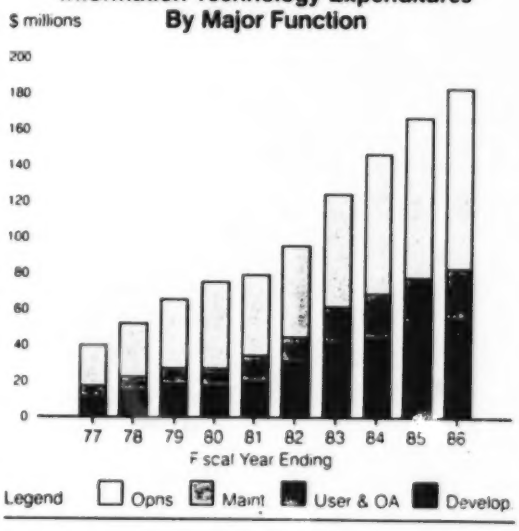
THE CHANGING FUNCTIONAL MIX OF INFORMATION TECHNOLOGY SPENDING

Table 5 (Section VIII) contains the amounts spent for the four major information technology functions. The relative proportion of each is found in Table 7. End-user computing and office automation was added as a separated category in 1983/84. In previous years, these costs were relatively small (estimated $2 million in 1981/82), and for the most part, had been unreported. Figure 2 is a graphical portrayal of the growth in each category.

Systems operations and systems maintenance costs, usually regarded as non-discretionary costs, represent 69% of all costs in 1984/85. This is only a small shift from the 72% that they represented ten years ago in 1976/77. The major change has been in the proportion spent on systems development. This has dropped from 28% in 1976/77, to 18% in 1984/85. End-user computing and office automation expenses now account for 13% of all information technology expenses.

Spending for traditional systems development has been growing barely at the rate of inflation during the last two years. In 1985/86, this situation is expected to reverse, with systems development increasing by $4.5 million, whilst end-user computing and office automation declines by $2.7 million.

Figure 2
Information Technology Expenditures By Major Function



Operational costs are expected to increase at approximately the same rate as the past two years (10% after inflation). Although the rate of spending on systems development is usually an accurate means of forecasting future operations and maintenance costs, no reduction is foreseen as a result of the recent slowdown in development. It will be offset by the full implementation of two major systems already developed and now in pilot stage (CIMS at Community and Social Services, and POLARIS at Consumer & Commercial Relations).

ACTUAL VERSUS ESTIMATED EXPENDITURES

For the first time, data was collected to compare estimated information technology expenditures with those actually incurred. Data was collected for the years 1983-84 and 1984-85.

In 1983-84, in total, information expenses were 3.7% over estimate. In 1984-85, expenditures rose to 11.2% above plan.

In both years, there is a pattern that exceeding estimates occurs more frequently, and in larger proportions in ministries with small information technology budgets rather than those with larger budgets. The table below contains the percentage variance from budget of ministries grouped by size category.

TABLE 2: PERCENTAGE VARIANCE FROM INFORMATION TECHNOLOGY ESTIMATES

Annual I.T. Spending	1983-84	1984-85
	%	%
$ 0 - 3 million	13	41
$ 3 - 8 million	9	32
$ 8 - 15 million	2	4
$ 15+ million	1	5
All ministries	**4**	**11**

In 1984-85, ministries with information technology budgets in the $0-3 million category, exceeded their planned expenses by 41%, whilst the variance was less than 4% for those ministries in the $8-15 million category.

In both years, personnel costs, including those for consultants were closer to plan than other costs. In 1983/84, personnel costs were 1% under plan, while other costs were 6% over. In 1984/85, personnel costs were 8% over budget, whilst other costs were 12% over.

USE OF EXTERNAL SERVICES

In 1984-85, the use of external services dropped sharply, not only in absolute terms, but also as a percentage of total. Consultant use is still the largest single category of external services, although this has been reducing steadily since 1982-83. In 1984-85, spending on consultants dropped to $11.1 million from $12.9 million in 1983-84. Costs spent on consultants, as a proportion of all staffing costs for systems development and maintenance, dropped from 45% in 1983-84, to 38% in 1984-85.

A similar pattern is found in the use of the private sector for data processing and data processing support. In 1984-85, $10.0 million was spent in the private sector, compared to $10.4 million in the previous year. As a proportion of total spending in these categories, use of the private sector dropped from 19% to 17%.

Planned expenditures in 1985-86 will partially reverse these trends. Spending on consultants is planned to rise by 18% over 1984-85, although the proportion of total staffing costs will remain at 38%.

Planned expenses for the use of service bureaux in 1985-86 will rise by $1.5 million (16%). A corresponding rise in public sector processing will leave the ratio of one to the other unchanged.

The use of public networks versus those of the Ministry of Government Services (MGS) remains stable. In the three year period 1983-84 to 1985-86, the use of public networks compared to MGS networks remains at 30%.

The use of external services varies by size of the information technology budget (see Table 19 Section VIII). Those organizations with large budgets will use external services proportionally a lot less than medium or smaller sized organizations. In the area of systems development, consulting costs for ministries with budgets under $15 million are approximately 54% of all staffing costs for systems development, whilst the corresponding figure for the three ministries over $15 million is 34%.

V Technology Penetration Trends

One of the objectives in changing the data collection process for this report in 1984-85, was to obtain additional data by which technology penetration could be measured and compared to other organizations.

No single measure was identified that could be uniformly applied to all ministries, and compared to other organizations. Instead three "indicators" were defined and measured.

The first indicator, information technology spending per employee, is an attempt to measure the extent to which an organization uses automation to assist its employees with their jobs. This is only valid if all office automation and end user computing costs are included.

A drawback to using this indicator to compare the government with traditional private sector white collar industries, is the inclusion of several blocks of employees that are not traditionally defined as white collar.

These groups include prison guards, the majority of ministry-run psychiatric hospital employees, environmental plant workers, security guards, roads maintenance workers, employees of Community & Social Services institutions, etc. In total, they are estimated to be 10-15% of all government employees. To prevent arbitrary distortion of the statistics, all employees were included in this indicator.

The second indicator of technology penetration defined was the number of workstations per employee. This is an attempt to measure the proportion of the organization that comes into regular contact with automated systems. For this measure, data processing terminals, word processors and personal computers are included as workstations, but electronic typewriters and calculators are not. As well as the above mentioned problem with the definition of employees, this measure is also subject to possible distortion by the reliability of the workstations data. Table 16 (in Section VIII) shows the detail number of workstations for each ministry.

The third indicator to be defined was the ratio of information technology expenditures to the total ministry spending. The problems with this indicator are similar to the other two — large amounts of money are spent on services unrelated to the use of technology.

In Table 3, on page 12, the three indices for each ministry, are listed in order of information technology spending per employee. For comparison, statistics for three Canadian financial institutions are shown in Table 3A. They were chosen as typical of large organizations with a 100% white collar employee population. Information technology spending as a percentage of total costs is not applicable in the case of banks, as spending is usually related to assets. Comparative figures for the Quebec and Federal governments are also included, although the Federal government figures do not include all office automation and end-user computing costs.

TABLE 3A: COMPARISONS OF TECHNOLOGY PENETRATION

Comparisons	I.T. Spending per Employee	Employees per Workstation
Life Insurance company	10,683	2.9
Chartered Bank A	7,253	3.2
Chartered Bank B	6,807	3.7
Ontario Ministry of Revenue	5,892	4.1
Quebec government	2,945	N/A
Ontario Government	2,040	11.5
Federal government	1,687	N/A

Since 1976, information technology spending has risen from $525 per employee to $2,040. After adjusting for inflation, real spending has doubled in 10 years. No figures are available prior to 1983-84 of the number of workstations. Over 50% are believed to have been acquired in the last three years. Information technology spending as a proportion of total government spending has been steadily rising, from 2.6% in 1980-81 to 3.8% in 1984-85.

The Ministry of Revenue is closest to being a 100% white collar organization similar to banks and insurance companies. Whilst the information technology spending and workstations per employee are not as great as the banks, this is probably due to the diversity of systems handled by Revenue. Banks have a small number of very large systems which support 80% of their employee population in the branch banking network.

At the other end of the spectrum are four ministries with large employee blocks outside the normal white collar definitions. The Ministries of Health, Community & Social Services, Solicitor

TABLE 3: INDICATORS OF TECHNOLOGY PENETRATION
(based on 1984-85 Actual data)

	Technology Spending per Employee	Employees per Workst'n	Technology Spending as % of Ministry Spending
Revenue	$5,892	4.1	11.8
Treasury & Economics	5,340	2.0	1.3
Industry & Trade	5,131	5.1	4.3
Management Board and CSC	4,064	2.4	1.3
Government Services (ex CTSD)	3,935	11.1	3.0
Transport & Communications	3,616	7.1	5.1
Consumer & Commercial Rel'ns.	3,482	6.9	9.3
Tourism & Recreation	2,939	14.1	3.5
Education	2,694	11.9	5.4
Municipal Affairs & Housing	2,631	11.5	15.2
Environment	2,252	20.1	2.8
Agriculture & Food	2,159	6.0	4.8
Energy	2,139	7.5	1.4
Natural Resources	2,119	13.2	2.2
Northern Affairs	2,018	11.7	.4
Citizenship & Culture	1,856	21.0	2.4
Labour	1,669	12.1	3.7
Health	1,410	9.0	3.8
Community & Social Services	1,249	35.5	3.4
Solicitor General	1,269	25.5	1.9
Attorney General	1,193	32.7	3.1
Correctional Services	487	18.6	3.2
Intergovernmental Affairs	321	4.5	.7
Total All Ministries	**$2,040**	**11.5**	**3.8**

General, and Correctional Services all fall into this category.

In Table 19, (see Section VIII) the indicators are summarized by size of information technology budget. In general, the larger the ministry's information technology budget, the higher the technology penetration indicators.

The indicators show that the use of technology is steadily increasing in the Ontario government. In comparison to purely white collar organizations, on the basis of statistics alone, the government stands some way behind. However, whilst the banks and insurance companies have had to develop large transaction processing systems to conduct the majority of their business, the nature and variety of services provided by the government does not lend itself in the most part to the development of similar systems.

In the future, it appears that the rate of increase in technology penetration will depend primarily on the success of introducing office automation, decision support systems and corporate data management, and to a lesser extent, on the development and re-development of traditional data processing systems. At present, the Computer & Telecommunication Services division of the Ministry of Government Services provides the spearhead for data processing operations, but no such organization exists for office automation and decision support systems, and information resource management is in its infancy in most ministries.

VI Trends in Systems Personnel

In 1982, the Ontario Systems Council initiated a study of several staffing and recruiting problems that had been plaguing many information technology communities throughout the government. The consultants recommended a number of concurrent initiatives to address these problems.

A subsequent task force by the Civil Service Commission led to the implementation by Management Board in 1984 of a Systems Staffing Adjustment Initiative. This allowed Ministries to increase their permanent headcount in information technology areas, by reducing the amounts available to be spent for consultants. This was implemented over the fiscal years 1983-84 and 1984-85. A target ratio of three employees for every consultant was established.

The data collected for this report clearly indicates that these objectives have been achieved. Table 4 and Figure 3 show the drop in numbers of consulting person-years, and corresponding increase in ratio of employees to consultants.

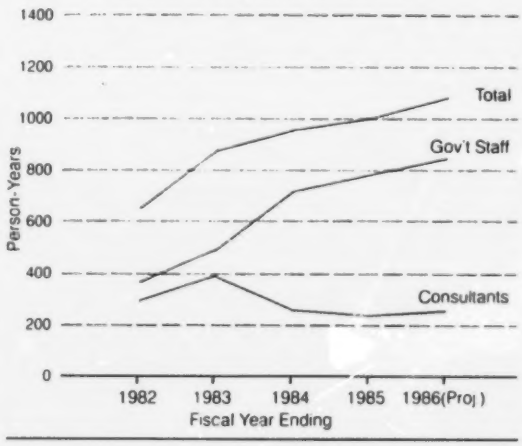
TABLE 4: USAGE OF CONSULTANTS AND CONTRACT PERSONNEL

	Number of Consulting Person-Yrs	Employees to Consultants Ratio (Tgt. 3 to 1)
1981-82	268	1.3 to 1
1982-83	382	1.2 to 1
1983-84	247	2.9 to 1
1984-85	221	3.5 to 1
1985-86 (projected)	247	3.3 to 1

The large drop in consultants from 1982-83 to 1983-84, and the increase in the ratio of employees to consultants is due in part to the conversion of a significant number of consultant positions to employee positions, either classified or unclassified. The number of consulting person years and the employee-to-consultant ratio for 1984-85 is shown by ministry in Table 17 (Section VIII).

Another objective of the Systems Staffing Adjustment Initiative was to reduce the vacancy rate for ministry jobs in information technology.

Figure 3
Trends in Systems Personnel



This has reduced from 21% in 1982 to 12% in March, 1985.

Table 13 (Section VIII) contains an analysis of the deployment of information technology personnel. Whilst the number of person years employed in 1984-85 was only a modest 4% higher than in 1983-84, the majority of the increase was for indirect categories. Effort spent on systems development and maintenance remained virtually unchanged. Support of end-user computing (client liaison and information centre staff) grew by 13 person-years (13%). However, there was an increase of 33 person years in management, project administration, and overhead.

In 1984-85, the average rate paid for consultants rose less than 1%, reflecting the low rate of inflation and the softening of demand within the government. In 1983-84, the average rate was $34.12 per hour, or $56,907 per person-year. This increased to $34.40 per hour, or $57,355 per year, in 1984-85.

The average cost of government personnel over the same period rose by 9.3%. For systems development and maintenance personnel, the average cost per person-year rose from $35,569 to $38,245. These costs exclude benefits and training costs which are approximately 20% of salary. When these are taken into account, the average cost of a person-year for a consultant is roughly 24% higher than for a government employee.

Using consultants instead of employees

provides a degree of flexibility when staffing systems projects. It affords flexibility for recruiting specific skills, and allows staff levels to be adjusted to match the peaks and valleys of requirements. The overall extra cost, or "premium", for using consultants depends on the employee/consultant staffing ratio, and the extra cost for a consulting person-year.

Because of the increase in the employee/consultant ratio, the overall "premium" paid for using consultants for systems development and maintenance has dropped. In 1984-85, the government paid approximately 7.4% more for staffing systems development and maintenance functions, than would have been paid for a totally inhouse effort. This is based upon an assumption of equal calibre of both groups.

This "premium" represents only 4.0% of the total cost of systems development and maintenance, when other indirect costs such as computer processing, management, project support and administration are included. When viewed in these terms, this does not appear to be an excessive amount to pay for the flexibility gained by using contract personnel.

In 1985-86, plans call for a 19% rise in consultant spending, and a 15% rise for government personnel. All the extra consulting effort will be employed in systems development and maintenance. Increases in government staffing costs will be equally distributed between direct and indirect areas.

VII Information Technology Security

INTRODUCTION

In January 1984, Management Board issued an Interim Guideline on Information Technology Security to provide ministries with an approach for reviewing and upgrading information security. It defined a basic level of protection which minimized the risks to the confidentiality, integrity, and availability of information.

As part of the 1985 Information Technology Report, Management Board requested ministries to provide a brief update on the progress made to date towards compliance with the Interim Guideline.

The approach outlined in the guideline required that all critical or sensitive operational systems be identified using the following definitions, and a three-level approach for reviewing and upgrading the level of security protection be initiated.

- Systems are designated as "critical" if they are crucial to the delivery of a program, process supplier invoices for payment, process employee information, produce cheques, or collect revenue. Systems are considered "sensitive" if they are essential to the normal operation of the client served.
- Level I is to provide basic protection by ensuring that all critical system data and program files are kept off-site; a contingency operations plan exists; and access to sensitive and critical information, and system documentation be controlled.
- Level II is to provide application-dependent protection tailored to the special security needs of each system which are determined by assessing the risks and backup alternatives. Potential solutions include secure processing facilities, contingency facilities to process critical and sensitive systems in the event of a disaster, and installing protection/detection controls on access to information of a sensitive or critical nature.
- Level III protection is achieved when all contingency plans are subject to regular testing; integrity controls are in place to control all information used for program delivery; secure facilities are in place for all computers, terminals and networks; system

TABLE S1: SUMMARY OF RESPONSES TO SECURITY SURVEY

	Number of systems				
		Current Level of Protection			
System Type	Under Review	Level I	Level 2	Level 3	Total
Critical	21	58	22	9	113
Sensitive	9	50	8	0	67
Regular Production	148	185	31	0	364
Other	37	13		24***	74
Unclassified	170**				170
Total	**388***	**306**	**61**	**33**	**788**

Notes:
* These systems are either under review or no data was provided concerning the level of protection.
** The Ministry of Health is currently undertaking a review of all its systems and has not completed a classification yet.
*** These systems all belong to the Ministry of Government Services.

program modifications are controlled; and a periodic verification of the operational level of all security measures is made by internal auditors.

RESULTS OF THE SURVEY

For the 1985 Report, ministries were asked to state which systems had been classified as critical or sensitive, and which level of protection had been reached for each, with the date future upgrades would occur. Ministries were also asked to comment on any problems they had encountered in the implementation of the guideline.

Table S1, above, summarizes the responses from the ministries The table contains the number of systems broken down by level of criticality and by current level of protection.

Table S1 requires careful interpretation. Almost half the total number of production systems (388 out of 788) are either currently being reviewed and the level of protection is not yet established, or no information was provided and are assumed not to conform to Level I criteria.

Major security reviews are currently underway at the ministries of Revenue, Health, and Transport & Communications encompassing almost 300 of the 388 systems. Of the remainder, 78% of the systems classified as "critical" or "sensitive" do not meet the critieria of Level II or Level III, although several ministries reported that some facilities, controls and contingency plans beyond basic protection were in place.

Approximately half the ministries indicated that they would be upgrading their level of protection in the fourth quarter, 1985. The remainder indicated that these upgrades would not occur until 1986 or 1987, or did not supply this information at all.

A further limitation of the above table results from the aggregation of statistics from very small to very large ministries. Each ministry has assessed its systems and current status from its own perspective. In the case of a disaster at a Ministry of Government Services Computing Centre, the inter-ministry priorization process would probably preclude providing computing resources to some systems that have been classified as critical by individual ministries.

COMMENTARY FROM MINISTRY RESPONSES

Several ministries provided commentary on their status, plans, and problems they were encountering. Some of the significant points follow:

There appears to be a false sense of security in some smaller ministries using Ministry of Government Services Computing Centre sites: they believe that the Centres have active contingency plans to continue processing at an alternate site.

The ministries with the large information technology budgets are waiting for a centralized direction to materialize for contingency planning and facilities. Without such plans, they feel that much of the work they do towards improving their security protection is negated.

Some ministries are finding it difficult to allocate funding to the issue of security. One large ministry is having difficulty finding the specific skills required to staff its positions for security and contingency planning projects.

Two ministries noted that the lack of system software compatibility between MGS computing centres reduces their capability to be used as backup centres for each other.

One ministry noted difficulty in using the Interim Guideline to decide, in the event of a disaster, which systems to process and which to suspend. This, it said, creates uncertainty and presents a serious disincentive to some systems' owners to allocate resources to security projects.

Ministries which have distributed processing facilities such as minicomputers, feel they are much less exposed to risks of processing site disasters, as they would be able to switch processing to another site. However, they also note that access controls and other security aspects are more difficult to implement and control in a decentralized environment.

CONCLUSIONS

Whilst the usefulness of the survey was somewhat diminished by the limitations in the data received, the following conclusions are possible:

- In times of financial and staffing constraint, it is difficult for ministries to redirect scarce resources from areas of immediate pay off such as, maintenance and new development work, to contingency planning and related information technology security matters. Progress towards implementing the Interim Security Guideline has, therefore, been much slower than the ideal. However, progress *is* being made with more than half the systems meeting at least the basic level of protection and the remainder under review.
- Ministries have focussed on the critical systems, with almost 80% of them being at least at the basic level of security. However, only about 20% of these are adequately protected. This will have to be greatly improved in the 1985-87 time frame.
- Some ministries demonstrated a misconception that security, especially contingency processing, was a responsibility of the Ministry of Government Services Computing Centre. In fact, as the Guideline clearly states, each ministry has the responsibility for ensuring that contingency plans are in place for each of its systems and data files.

VIII Tables

	Table No.	Page
The following four tables are included in the text at the pages noted:		
Components of Information Technology Costs	1	9
Percentage Variance from I.T. Estimates	2	10
Indicators of Technology Penetration	3	12
Usage of Consultants and Contract Personnel	4	13
ONTARIO GOVERNMENT TOTALS		
Information Technology Expenditures	5	18
Percentage Growth Rates of I.T. Expenditures	6	18
Expense Components as Percentage of Total	7	18
Comparison of I.T. Expenditures with other Provinces	8	19
I.T. Estimates by Expense Category	9	19
Expense Categories as a Percentage of Total	10	20
Equipment and Data Communications Expenditures	11	20
Utilization of Private Sector Resources	12	21
Deployment of Information Technology Personnel	13	21
MINISTRY TOTALS		
Information Technology Estimates	14	23
Comparison of Actual Versus Estimated I.T. Expenses	15	24
Information Technology Penetration Indicators	16	25
Use of Consultants and Contract Personnel	17	26
Components of I.T. Budget by Major Category	18	27
Comparison of Ministries by Size of I.T. Budget	19	28

5: INFORMATION

Technology Expenditures for the Ontario Government
(Based on estimates except as noted by *) $ Million

	76/77	77/78	78/79	79/80	80/81	81/82	82/83	*83/84	*84/85	85/86
Systems development	11.4	14.5	17.5	15.4	20.4	27.3	41.0	28.2	29.9	34.3
Systems maintenance	5.0	6.7	7.5	9.6	12.2	15.7	18.6	23.8	24.4	26.2
Systems operations	24.4	30.7	36.7	47.8	46.3	51.8	62.6	78.8	88.9	103.4
User computing & OA								15.4	22.1	19.4
Total	**40.8**	**51.9**	**61.7**	**72.8**	**79.0**	**94.8**	**122.2**	**146.1**	**165.3**	**183.3**

6: PERCENTAGE GROWTH RATES OF INFORMATION

Technology Expenditures in the Ontario Government
(Based on estimates except as noted by *) Adjusted for inflation

	Real Percent Growth									Average Growth %		
	77/78	78/79	79/80	80/81	81/82	82/83	*83/84	*84/85	85/86	78-80	81-83	84-86
Systems development	19.0	11.2	-19.3	21.8	18.5	35.6	-35.0	1.6	10.9	2.2	25.1	-9.9
Systems maintenance	25.3	3.2	17.4	16.3	14.8	6.8	20.7	-1.5	3.6	14.9	12.6	7.2
Systems operations	17.5	10.2	19.4	-11.0	-0.6	9.0	18.9	8.1	12.2	15.7	-1.2	13.0
User computing & OA								37.5	-15.3			
Total	**18.9**	**9.6**	**8.2**	**-0.5**	**6.7**	**16.3**	**13.0**	**8.4**	**7.0**	**12.1**	**7.3**	**9.5**
Growth in voted estimates					**-3.6**	**-2.4**	**7.3**	**-1.9**				

7: EXPENSE COMPONENTS OF INFORMATION

Technology Expenditure Estimates — as a Percent of Total
(Based on estimates except as noted by*)

	Percent of Total									
	76/77	77/78	78/79	79/80	80/81	81/82	82/83	*83/84	*84/85	85/86
Systems development	27.9	27.9	28.4	21.2	25.9	28.8	33.5	19.3	18.1	18.7
Systems maintenance	12.2	12.9	12.2	13.2	15.4	16.6	15.2	16.3	14.8	14.3
Systems operations	59.8	59.1	59.5	65.7	58.7	54.7	51.2	53.9	53.8	56.4
User computing & OA								10.6	13.4	10.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

8: COMPARISON OF INFORMATION

Technology Estimates in Ontario with other Provinces
$ Million

	EDP Estimates						Average Growth %
	80/81	81/82	82/83	83/84	84/85	85/86	81-86
Ontario	79.0	94.8	122.2	140.9	148.6	183.3	17.9
Newfoundland	7.4	8.2	9.2	10.4	N/A	11.1	7.6
Saskatchewan	8.2	18.0	36.0	N/A	N/A	25.0	8.6
Quebec	105.1	109.4	127.7	144.4	183.2	209.8	17.7
British Columbia	49.1	57.8	60.0	61.0	68.2	77.2	7.5
Alberta	33.7	48.0	65.0	72.5	78.3	78.1	12.9
Manitoba	11.1	13.6	14.8	15.7	18.4	20.0	10.2

	Per Capital EDP						Average Growth %
	80/81	81/82	82/83	83/84	84/85	85/86	81-86
Ontario	9.17	10.90	13.87	15.78	16.42	20.26	16.8
Newfoundland	13.04	14.44	16.08	17.96	N/A	18.98	7.1
Saskatchewan	8.45	18.41	36.33	N/A	N/A	24.55	7.5
Quebec	16.35	16.91	19.64	22.10	27.87	31.92	17.2
British Columbia	17.96	20.76	21.30	21.35	23.60	26.72	6.5
Alberta	15.15	20.81	27.73	30.98	33.40	33.30	12.5
Manitoba	10.86	13.14	14.11	14.83	17.24	18.74	9.3
Average	**13.02**	**15.31**	**18.84**	**N/A**	**N/A**	**25.70**	**13.8%**

9: COMPONENTS OF INFORMATION

Technology Estimates for the Province of Ontario
$ Thousand

							Average Growth %	
	80/81	81/82	82/83	83/84	84/85	85/86	81-86	Infl. Adj.
Data processing	43,652	46,279	53,389	67,097	74,844	71,139	10	3
Equipment/software	8,250	10,734	13,829	21,382	20,857	27,732	27	19
Data communications	1,153	1,895	2,581	5,559	6,482	12,366	61	50
Systems administration	3,924	5,591	7,571	10,585	11,560	23,119	43	33
Systems development	14,637	20,209	32,638	21,970	18,931	19,306	6	-2
Systems maintenance	7,339	10,062	12,163	14,260	15,934	15,850	17	9
OA/PCs equip & communications						13,834	—	—
Total	**78,953**	**94,769**	**122,171**	**140,853**	**148,609**	**183,347**	**18%**	**10%**

10: COMPONENTS OF INFORMATION

Technology Estimates as a Percent of Total

	Percentage of Total					
	80/81	81/82	82/83	83/84	84/85	85/86
Data processing	55.3	48.8	43.7	47.6	50.4	38.8
Equipment/software	10.4	11.3	11.3	15.2	14.0	15.1
Data communications	1.5	2.0	2.1	3.9	4.4	6.7
Systems administration	5.0	5.9	6.2	7.5	7.8	12.6
Systems development	18.5	21.3	26.7	15.6	12.7	10.5
Systems maintenance	9.3	10.6	10.0	10.1	10.7	8.6
OA/PCs equip & communications						7.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Note: Tables 9 & 10 are similar in content to Tables 5 & 7. Tables 9 & 10 are compiled directly from the data supplied by ministries, whilst Tables 5 & 7 are the result of certain algorithms being applied to the original data. Tables 9 & 10 contain estimates for the years 1983-84 and 1984-85, whilst Tables 5 & 7 contain actuals.

11: EQUIPMENT AND DATA COMMUNICATIONS EXPENDITURES

$ Thousands

	1984/85 Actual –				1985/86 Planned			
Equipment	Min-istries	CTSD	Total	% of Total	Min-istries	CTSD	Total	% of Total
Mainframe & superminis	8,689	23,225	31,914	52	12,494	25,157	37,651	60
Dedicated word processing	4,945	130	5,075	8	4,192		4,192	7
Data entry	4,073		4,073	7	3,392		3,392	5
RJE terminals	713		713	1	662		662	1
Microfilm equipment	1,694		1,694	3	1,648		1,648	3
Personal computers	9,619	70	9,689	16	6,857	25	6,882	11
Other (incl. minicomputers)	6,141	1,867	8,008	13	6,165	1,926	8,091	13
Total	**35,873**	**25,292**	**61,165**	**100%**	**35,410**	**27,108**	**62,518**	**100%**
Data Communications								
Private sector networks	1,422	108	1,530	10	1,676	120	1,796	11
MGS networks	3,759		3,759	24	4,559		4,559	28
Modems, ctrls., ded. lines	6,671	770	7,441	48	6,131	850	6,981	43
LANs etc.	793	30	823	5	854	100	954	6
Ministry doc. transmission	757		757	5	807		807	5
Private doc. transmission	1,179	51	1,230	8	1,125	50	1,175	7
Total	**14,580**	**959**	**15,539**	**100%**	**15,152**	**1,120**	**16,272**	**100%**

12: UTILIZATION OF PRIVATE-SECTOR RESOURCES

(Based on actual data except as noted) $ Thousands

	1983/84			1984/85			1985/86 (EST)		
	Private	Public	% Priv.	Private	Public	% Priv.	Private	Public	% Priv.
Data processing services	7,815	42,802*	15.4	6,711	44,137*	13.2	7,927	51,505*	13.3
Data processing support	2,609	376	87.4	2,288	532	81.1	2,510	567	81.6
Equipment	27,467			35,873			35,410		
Data communications	6,399	4,034	61.3	10,064	4,516	69.0	9,787	5,366	64.6
Systems development	8,242	6,830	54.7	7,098	8,535	45.4	8,424	10,882	43.6
Purchased software	1,393			3,100			3,370		
Systems maintenance	4,676	9,421	33.2	4,029	10,317	28.1	4,700	11,151	29.6
Info. tech. administration		24,011			28,125			31,749	
Total	**58,601**	**87,475**	**40.1%**	**69,162**	**96,162**	**41.8%**	**72,128**	**111,219**	**39.3%**

Note: Amounts marked by * are amounts paid by Ministries to CTSD. When these costs are allocated between private and public sectors, the totals are:

Total (incl. CTSD)	**88,391**	**57,685**	**60.5%**	**100,587**	**64,737**	**60.8%**	**109,624**	**73,723**	**59.8%**

13: DEPLOYMENT OF INFORMATION

Technology Personnel in the Ontario Government
(Based on actual data except as noted)

	1983/84				1984/85			
Person Years by Category	Contract	Gov't	Total	% Cont.	Contract	Gov't	Total	% Cont.
Software								
Appl. packages*	12	0	12	100	15	0	15	100
Custom development*	139	204	343	40	117	226	343	34
Appl. maintenance	88	244	332	27	77	254	331	23
Operating systems**	8	1	9	86	12	0	12	100
Total				**35%**				**32%**
Info Tech Administration								
Management		125	125			132	132	
Project/admin support		193	193			208	208	
Client liaison/Info centre		98	98			111	111	
Data control/entry		26	216			211	211	
Operations		131	131			144	144	
Facilities mgmt.		1	1			1	1	
Ministry overhead**		2	2			6	6	
Other exp'tures***		35	35			42	42	
Total	**247**	**1250**	**1497**	**16%**	**221**	**1335**	**1556**	**14%**

13: DEPLOYMENT OF INFORMATION

Technology Personnel in the Ontario Government
(Based on actual data except as noted)

Costs ($,000) by Category	1983/84 Actual			1984/85 Actual			1985/86 EST.		
	Cont.	Gov't	Total	Cont.	Gov't	Total	Cont.	Gov't	Total
Software									
Appl. packages*	1,248		1,248	2,777		2,777	3,067		3,067
Custom development*	8,242	6,830	15,072	7,098	8,535	15,633	8,424	10,882	19,306
Appl. maintenance	4,676	9,105	13,781	4,029	9,823	13,852	4,700	10,387	15,087
Operating systems**	316	145	461	494	322	817	764	303	1,067
Info Tech Administration									
Management		5,347	5,347		5,835	5,835		6,287	6,287
Project/admin support		5,592	5,592		6,645	6,645		7,129	7,129
Client liaison/Info centre		3,214	3,214		3,826	3,826		4,568	4,568
Data control/entry		4,184	4,184		4,368	4,368		4,867	4,867
Operations		2,856	2,856		3,299	3,299		3,724	3,724
Facilities mgmt.		22	22		39	39		39	39
Ministry overhead**		1,363	1,363		2,160	2,160		2,307	2,307
Other exp'tures***		1,434	1,434		1,953	1,953		2,829	2,829
Total	**14,482**	**40,091**	**54,573**	**14,398**	**46,805**	**61,203**	**16,954**	**53,321**	**70,275**

*Costs may include items for which the corresponding number of person years is not known.
**Costs include expenditures that do not have related people expenses
***Costs may be incurred in both public and private sector.

14: INFORMATION

Technology Estimates by Ministry
$ Thousands

	80/81	81/82	82/83	83/84	84/85	85/86	Average Growth % 81-86	Average Growth % Infl. Adj.	Rank 80-81	Rank 85-86
Health	13,123	12,484	13,563	16,662	17,899	17,208	6	-2	1	3
Revenue	9,548	15,775	19,811	20,954	23,004	24,004	20	12	3	2
Transport/Commun'tns	10,305	10,879	20,257	23,289	25,048	35,539	28	19	2	1
Comm. & Soc. Servs.	4,627	7,604	9,195	12,509	11,534	13,836	25	16	7	4
Consumer/Comm. Relns	3,619	4,818	5,733	7,068	7,697	9,006	20	12	10	8
Government Services	6,177	7,312	11,100	9,643	9,819	11,709	14	6	5	5
Mun. Affs. & Housing	6,523	6,450	8,738	9,273	12,849	10,995	11	3	4	7
Natural Resources	3,699	3,759	3,965	7,342	6,678	11,275	25	16	9	6
Agriculture & Food	971	1,250	1,767	2,399	1,442	4,433	36	26	15	13
Attorney General	3,989	3,659	5,759	6,205	6,422	6,312	10	2	8	11
Education	4,805	5,245	5,461	5,664	6,062	7,894	10	3	6	10
Environment	1,356	1,628	2,781	2,956	2,638	5,208	31	22	13	12
Solicitor General	2,884	3,897	5,240	4,445	4,658	8,363	24	15	12	9
Treasury & Economics	3,486	2,955	2,944	2,955	3,027	2,430	-7	-13	11	17
Citizenship/Culture	1,087	1,013	776	818	599	1,518	7	0	14	19
Correctional Servs.	831	1,311	1,683	2,209	2,418	2,976	29	20	17	15
Energy	0	0	45	255	353	548			-	21
Industry & Trade	499	1,538	818	1,524	1,630	3,525	48	38	19	14
Intergov'mental Affs	0	1,472	0	95	26	29			-	23
Labour	886	1,112	1,485	3,027	3,183	2,625	24	16	16	16
Mgmt. Board/CSC	540	579	1,053	777	799	1,358	20	12	18	20
Northern Affairs	0	30	0	44	47	448			-	22
Tourism & Recreation	0	0	0	740	777	2,110			-	18
Total	**78,953**	**94,769**	**122,171**	**140,852**	**148,609**	**183,347**	**18%**	**10%**		

Note: Ministries are grouped by size of I.T. spending based upon 1984-85 Actuals. Data in this table are Estimates.

15: COMPARISON OF ACTUAL VERSUS ESTIMATED INFORMATION

Technology Spending by Ministry
$ Thousands

	1983/84				1984/85				2 year
	Estimate	Actual	Var	Var %	Estimate	Actual	Var	Var %	Var %
Transport/Commun'tns	23,289	28,860	5,571	23.9	25,048	32,962	7,914	31.6	27.9
Revenue	20,954	18,348	(2,607)	-12.4	23,004	20,031	(2,973)	-12.9	-12.7
Health	16,662	14,578	(2,084)	-12.5	17,899	16,094	(1,805)	-10.1	-11.3
Comm. & Soc. Servs.	12,509	11,843	(666)	-5.3	11,534	13,129	1,595	13.8	3.9
Government Services	9,643	11,442	1,799	18.7	9,819	10,351	532	5.4	12.0
Mun. Affs. & Housing	9,273	9,579	307	3.3	12,849	10,175	(2,675)	-20.8	-10.7
Consumer/Comm. Relns	7,068	6,297	(771)	-10.9	7,697	8,483	786	10.2	0.1
Natural Resources	7,342	7,582	240	3.3	6,678	8,289	1,611	24.1	13.2
Education	5,664	6,112	447	7.9	6,062	7,273	1,211	20.0	14.1
Attorney General	6,205	5,380	(826)	-13.3	6,422	6,260	(162)	-2.5	-7.8
Solicitor General	4,445	4,862	417	9.4	4,658	5,892	1,234	26.5	18.1
Agriculture & Food	2,399	3,813	1,414	58.9	1,442	4,970	3,528	244.6	128.7
Environment	2,956	3,864	908	30.7	2,638	4,489	1,851	70.2	49.3
Treasury & Economics	2,955	2,754	(201)	-6.8	3,027	3,043	16	0.5	-3.1
Industry & Trade	1,524	2,240	716	47.0	1,630	2,848	1,218	74.7	61.3
Correctional Servs.	2,209	2,691	482	21.8	2,418	2,709	291	12.0	16.7
Labour	3,027	2,449	(578)	-19.1	3,183	2,589	(594)	-18.6	-18.9
Mgmt. Board/CSC	777	729	(48)	-6.2	799	2,251	1,452	181.7	89.0
Tourism & Recreation	740	1,335	596	80.5	777	1,715	938	120.7	101.1
Citizenship/Culture	818	628	(190)	-23.2	599	803	203	33.9	0.9
Energy	255	259	4	1.6	353	550	197	55.8	33.1
Northern Affairs	44	337	293	665.9	47	370	323	687.2	676.9
Intergov'mental Affs	95	95	0	0.0	26	50	24	90.9	19.8
Total	**140,852**	**146,075**	**5,224**	**3.7%**	**148,609**	**165,324**	**16,715**	**11.2%**	**7.6%**

16: INFORMATION

Technology Penetration Indicators
(Based on 1984/85 actual data except as noted)

	I.T. spending per employee	I.T. as % of voted estimate	Number of Workstations						
			Mainframe Terminal	Word Proc.	Data Entry	PC	Other	Total	Emp. per workst'n
Health	1,410	3.8	125	92	364	32	28	641	19.0
Revenue	5,892	11.8	497	90	92	153	164	996	4.1
Transport/Commun'tns	3,616	5.1	1,049	147	9	125	61	1,391	7.1
Comm. & Soc. Servs.	1,249	3.4	0	32	181	95	4	312	35.5
Consumer/Comm. Relns	3,482	9.3	229	77	22	32	13	373	6.9
Government Services	3,935	3.0	100	27	20	113	7	267	11.1
Mun. Affs. & Housing	2,631	15.2	48	18	82	222	37	407	11.5
Natural Resources	2,119	2.2	29	29	35	262	47	402	13.2
Agriculture & Food	2,159	4.8	0	57	2	249	32	340	6.0
Attorney General	1,193	3.1	0	19	12	32	99	162	32.7
Education	2,694	5.4	89	4	4	150	0	247	11.9
Environment	2,252	2.8	0	40	0	40	35	115	20.1
Solicitor General	1,269	1.9	142	70	22	17	7	258	25.5
Treasury & Economics	5,340	1.3	0	38	3	64	127	232	2.0
Citizenship/Culture	1,856	2.4	0	5	0	22	12	39	21.0
Correctional Servs.	487	1.2	40	71	8	20	190	329	18.6
Energy	2,139	1.4%	16	7	0	9	2	34	7.5
Industry & Trade	5,131	4.3	0	105	0	22	8	135	5.1
Intergov'mental Affs	321	0.7	0	16	0	4	0	20	4.5
Labour	1,669	3.7	13	59	15	15	28	130	12.1
Mgmt. Board/CSC	4,064	1.3	0	39	0	94	5	138	2.4
Northern Affairs	2,018	0.4	0	11	0	5	3	19	11.7
Tourism & Recreation	2,939	3.5	0	23	0	19	9	51	14.1
Totals 1984/85	**$2,040**	**3.8%**	**2,377**	**1,076**	**871**	**1,796**	**823**	**7,038**	**11.5**
Totals 1983/84	**$1,823**	**3.4%**	**2,108**	**688**	**878**	**826**	**823**	**5,323**	**15.3**
Totals 1980/81	**$ 964**	**2.5%**							
Totals 1976/77	**$ 478**	**N/A**							

17: USE OF CONSULTANTS AND CONTRACT PERSONNEL BY MINISTRY

(Excluding operations staff, project & admin. support staff, and management) In person years

	1981/82		1982/83		1983/84		1984/85		Percentage Contract			
	Gov't	Cont.	Gov't	Cont.	Gov't	Cont.	Gov't	Cont.	81/82	82/83	83/84	84/85
Health	62	38	70	41	72	17	93	8	38	37	19	8
Revenue	34	55	49	53	63	24	67	25	62	52	28	27
Transport/Commun'tns	40	20	68	36	207	45	191	37	33	35	18	16
Comm. & Soc. Servs.	22	30	25	38	66	45	67	31	58	60	41	32
Consumer/Comm. Relns	10	12	14	17	17	5	23	10	55	55	23	30
Government Services	33	10	30	14	49	19	49	5	23	32	28	9
Mun. Affs. & Housing	25	27	22	46	36	21	34	14	52	68	37	29
Natural Resources	5	5	35	28	35	9	57	9	50	44	20	14
Agriculture & Food	5	3	9	6	10	7	14	9	38	40	41	39
Attorney General	11	9	18	10	26	14	27	14	45	36	35	34
Education	51	25	53	43	34	9	31	28	33	45	21	47
Environment	9	5	15	5	11	6	13	5	36	25	35	28
Solicitor General	6	6	23	17	27	7	36	6	50	43	21	14
Treasury & Economics	9	4	4	5	8	5	10	2	31	56	38	17
Citizenship/Culture			4	1	11	0	11	0		20		
Correctional Servs.	8	5	15	7	10	0	11	0	38	32		
Energy				2	1					33		
Industry & Trade	4	5	5	3	7	7	13	10	56	38	50	43
Intergov'mental Affs				–								
Labour	12	3	11	7	13	0	13	0	20	39		
Mgmt. Board/CSC	4	3	5	1	6	0	8	0	43	17		
Northern Affairs												
Tourism & Recreation	4	3	1	4	2	6	4	8	43	80	75	67
Totals	**354**	**268**	**478**	**382**	**709**	**247**	**770**	**221**	**43%**	**44%**	**26%**	**22%**
Total Person Years		**622**		**860**		**956**		**992**				

18: COMPONENTS OF INFORMATION

Technology Budget by Ministry
(Based on 1984/85 actual data) $ Thousands

		Percentage of information technology budget						
	Total	DP Proc & Supp't	Equip & Softwre	Data Comm'ns	Sys Admin	Sys Develop	Sys Maint	End User/OA Equip & Comm
Transport/Commun'tns	32,962	39	11	21	11	7	6	5
Revenue	20,031	35	20	3	15	3	13	10
Health	16,094	50	15	2	12	8	11	2
Comm. & Soc. Servs.	13,129	41	13	2	9	24	2	9
Government Services	10,351	36	17	3	12	10	16	5
Mun. Affs. & Housing	10,175	39	11	4	23	3	9	11
Natural Resources	8,289	25	18	4	10	12	7	24
Education	7,273	34	5	2	15	16	22	7
Attorney General	6,260	36	31	4	9	12	3	6
Solicitor General	5,892	27	20	7	17	16	3	10
Agriculture & Food	4,970	48	7	3	5	9	5	23
Environment	4,489	37	13	4	6	10	9	22
Treasury & Economics	3,043	37	19	2	5	8	9	20
Industry & Trade	2,848	19	1	12	10	14	20	24
Correctional Servs.	2,709	28	20	7	17	1	12	15
Labour	2,589	51	2	2	18	7	8	12
Mgmt. Board/CSC	2,251	10	7	0	10	10	2	59
Tourism & Recreation	1,715	17	13	17	0	16	17	18
Citizenship/Culture	803	14	7	0	51	3	1	25
Energy	550	21	39	2	2	6	0	30
Northern Affairs	370	15	10	0	0	0	0	75
Intergov'mental Affs	50	0	0	17	0	0	0	83
All Ministries — %		**37**	**15**	**7**	**12**	**9**	**9**	**10**
All Ministries — $000	**165,324**	**61,374**	**24,408**	**11,852**	**20,419**	**15,633**	**14,346**	**17,292**

19: COMPARISON OF MINISTRIES IN DIFFERENT SIZE CATEGORIES

(1984/85 actual data except as noted) $ Million

	Information Technology Budget				
	$15	$8-15	$3-8	$0-3	All
Size					
Number of Ministries	3	5	6	9	23
Share of gov't total I.T. $	42%	31%	19%	8%	100%
Average I.T. spending $M	23.0	10.1	5.3	1.5	7.2
Percent of Voted Estimates	5.6%	4.0%	2.8%	1.8%	3.8%
Avg. total of person-years	220	89	54	14	68
Growth					
Avg 80-85 growth in Voted Estimate	6.9%	9.0%	10.4%	5.4%	8.1%
Avg 80-85 growth in Info Tech.	18.9%	18.5%	8.5%	26.5%	17.1%
Adjusted for inflation					
Avg 80-85 growth in Voted Estimate	-1.3%	0.7%	1.9%	-2.7%	-0.2%
Avg 80-85 growth in Info. Tech.	9.8%	9.4%	0.2%	16.8%	8.1%
Info. Tech. 1985/86 growth over 1984/85					
Plan over plan	16.4%	17.0%	42.9%	53.9%	23.4%
Plan over actual	11.1%	12.7%	8.5%	9.0%	10.9%
Mix					
Systems Development	15%	21%	20%	15%	18%
Systems Maintenance	16%	13%	14%	15%	15%
Operations	59%	52%	50%	41%	54%
End user & OA	9%	13%	15%	29%	13%
	100%	100%	100%	100%	100%
Actual vs Estimate					
% Variance 83/84	1.4%	2.0%	8.8%	13.4%	3.7%
% Variance 84/85	4.8%	3.8%	31.7%	41.2%	11.2%
Penetration					
I.T. spending/employee ($)	2,646	2,169	1,626	1,285	2,040
Employees/workstation	11.6	7.6	6.9	8.3	11.5
Avg. # WPs installed	110	37	38	37	47
Avg. # PCs installed	103	145	92	23	78
Avg. # Total WSs installed	1,009	352	226	99	306
Use of Private Sector					
Avg contract person-years per Ministry	23	14	11	2	10
Contract as % of total person-years	11%	16%	20%	16%	14%
% of $$$ in private sector in:					
Data processing	8%	21%	14%	13%	13%
DP Support	93%	77%	77%	46%	81%
Data communications	12%	71%	64%	36%	37%
Systems development	34%	46%	51%	62%	45%
Systems maintenance	25%	30%	41%	19%	29%